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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/761,317	01/17/2001	Yoshiyuki Tonami	36856.406	4649
7590 12/09/2003				
Keating & Bennett LLP 10400 Eaton Place, Suite 312 Fairfax, VA 22030			EXAMINER KACKAR, RAM N	
			ART UNIT	PAPER NUMBER

1763

DATE MAILED: 12/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/761,317

Applicant(s)

TONAMI ET AL.

Examiner

Ram N Kackar

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 November 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20, 25 and 26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20, 25 and 26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3-4, 6-7, 9-10, 12-13, 16-17, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aiichirou Baigetsu (US 5080763).

Aiichirou Baigetsu discloses a process for wiring formation and disclose a feeder film partially on a substrate, a plating base overlapping the feeder film ((Fig 1B and Col 1 lines 27-31 as double layer of titanium and palladium as diffusion barrier) and forming an electroplated layer on the base film (Fig 1c and Col 1 lines 35-47). Aiichirou Baigetsu also teaches that the feeder layer whose primary purpose is providing a conductive path for electroplating to occur is removed by wet etching after that purpose is served (Col 1 lines 48-53).

Aiichirou Baigetsu does not particularly disclose that the base or barrier layer is only partially formed on the feeder layer.

However, since barrier layer is required only under the gold wiring layer it would have been obvious to have barrier layer only partially formed.

3. Claims 1-3, 6-9, 12-13, 16-17, 20 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arikawa et al (JP 02139934).

Arikawa et al disclose a process for wiring formation and disclose a feeder film partially on a substrate, a plating base overlapping the feeder film (abstract – as a triple layer of titanium and platinum and gold as feeder layer barrier layer and bonding layer) and forming an electroplated layer on the base film (Fig 1 a-e and Abstract). Arikawa et al teach that the feeder layer whose primary purpose is providing a conductive path for electroplating to occur is removed by wet etching after that purpose is served (Abstract).

Arikawa et al do not particularly disclose that the base or barrier layer is only partially formed on the feeder layer.

Repeating the discussion as above, since barrier layer is required only under the gold wiring layer it would have been obvious to have barrier layer only partially formed.

4. Claims 1- 20 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirano et al (US 5550068) in view of the applicants admitted prior art (Fig 1a-1d and 2) and further in view of Yoshiro Hayashi (US 5336929).

Hirano et al disclose a process for wiring formation and disclose a feeder film partially on a substrate (Fig 2a-2), a plating base partially overlapping the feeder film (Fig 2k-11), the plating base film formed by sputtering (Col 3 lines 49-53) in an opening made by masking using photoresist material (Col 3 lines 38-40) and forming a plated wiring on the base film (Fig 2m-12 and Col 3 lines 59-62). The plating base film is disclosed to be a bi layer with gold over tungsten or an alloy double layer providing improved adhesion (Col 3 lines 56-58). However tungsten layer is known to prevent diffusion of gold as taught by Hayashi (Abstract and Col 5 lines 5-11 and Fig 6b). This bi-layer therefore functions both as an adhesive layer and a diffusion preventive layer.

Hirano et al teach that the feeder layer whose primary purpose is providing a conductive path for electroplating to occur is removed after that purpose is served (Col 2 lines 28-31).

Further Hirano et al teach that in another embodiment there could be a base layer between the electroplated gold layer and a layer to conduct electricity (Feeder layer Col 2 lines 28-31 and Fig 1k-4). The feeder layer in this embodiment is disclosed to be removed.

This conventional method of removing the feeder film is disclosed in Applicants admitted prior art (Page 2 line 15) by wet etching.

Therefore it would have been obvious for one of ordinary skill in the art at the time invention was made to use this step to remove the feeder film by any method including wet etch as suggested by applicants prior art.

Regarding claims 5, 11, 14 and 18, Hirano et al do not expressly disclose the width of the base film to be greater than the width of the feeder film. However they disclose the control of resistance of the base film by controlling thickness. As the width of the base film controls the resistance in the same way, it would have been obvious to one of ordinary skill in the art at the time invention was made to increase the width of the base film to decrease its resistance.

5. Claims 1 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuoka Takashi (JP 06260482) in view of the applicants admitted prior art (Fig 1a-1d and 2).

Matsuoka Takashi discloses a process for wiring formation (Fig 19-26) and discloses a feeder film (4), a plating base partially overlapping the feeder film (5), forming a plated wiring on the base film (8c) and a reverse tapered shape of resist pattern (6) before a lift off step so as not to allow layer 5 and 5c to join.

Matsuoka Takashi in the same way as Hirano et al, however do not disclose wet etching to remove not needed feeder film.

This conventional method of removing the feeder film is disclosed in Applicants admitted prior art (Page 2 line 15) by wet etching.

Therefore it would have been obvious for one of ordinary skill *in the art at the time* invention was made to use this step to remove the feeder film by any method including wet etch as suggested by applicants prior art because of its simplicity and selectivity.

Response to Amendment

6. Applicant's arguments filed 10/14/2003 have been fully considered but they are not persuasive.

Regarding rejection based on Hayashi, the passage " However tungsten layer is known to prevent diffusion of gold (Abstract and Col 5 lines 5-11 and Fig 6b)" refers to Hayashi.

Regarding the teaching of removing the feeder layer- the conductive layer used for connecting electricity for electroplating- examiner has relied upon the teaching disclosed in Col 2 line 28-31. This should be read in context with the drawing (1a- 1o). *In this case numeral 4 is* used to disclose feeder layer, which is used for connecting electricity for electroplating and is later removed by using techniques applicable to removing metallic layers. This example clearly discloses that after the basic purpose of the feeder film is accomplished the layer may be removed. There would be no purpose in keeping unwanted conducting layer, when real estate on the substrate could be needed for active components later on.

Regarding JP 06-260482 to Takashi, this reference also teaches feeder layer that is removed after its purpose is done. Drawings 19-26 of Takashi as mentioned in the office action

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are explained in paragraph 0034 of the English translation submitted. The feeder layer is disclosed to be layer 2 over which layer 4 is formed (drawings 1-3). As explained with regards to drawing 20 the feeder layer is partially etched to make opening for the base film. In drawing 25 layer 4 is removed. As both layers 2 and 4 act to facilitate conduction of electricity for electroplating the combination would be a feeder film. Base film 5c clearly overlaps this feeder film.

In this office action two more references that of Aiichirou Baigetsu (US 5080763) and Arikawa et al (JP 02139934) are cited to particularly disclose the removal of feeder film after electroplated film is finished and bonding and diffusion prevention layer under electroplated film.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N Kackar whose telephone number is 703 305 3996. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703 308 1633. The fax phone number for the organization where this application or proceeding is assigned is 703 872 9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0661.

RK


GREGORY MILLS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER